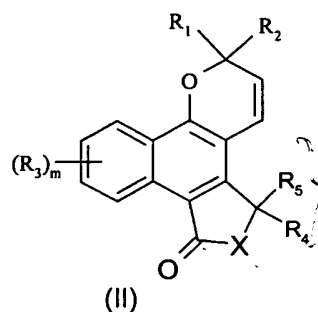
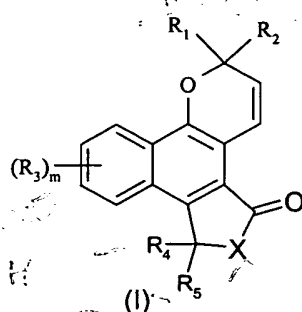


WHAT IS CLAIMED IS:

1. A compound having the formula (I) or (II) below:



in which:

- X is an oxygen or NR<sub>6</sub>, R<sub>6</sub> being a hydrogen, a linear or branched alkyl group comprising from 1 to 12 carbon atoms, a cycloalkyl group comprising from 3 to 12 carbon atoms, an aryl group comprising in its basic structure 6 to 24 carbon atoms, or a heteroaryl group comprising in its basic structure 4 to 24 carbon atoms and at least one heteroatom selected from sulfur, oxygen, and nitrogen, said aryl or heteroaryl group's basic structure optionally being substituted by at least one substituent selected from the group consisting of a linear or branched alkyl comprising 1 to 12 carbon atoms, a linear or branched alkoxy comprising 1 to 12 carbon atoms, a halogen, and a hydroxy;
- R<sub>4</sub> and R<sub>5</sub>, which are identical or different, independently represent a hydrogen, a hydroxy, or a linear or branched alkyl group comprising 1 to 6 carbon atoms, or R<sub>4</sub> and R<sub>5</sub> together form an oxo group (=O);
- R<sub>1</sub> and R<sub>2</sub>, which are identical or different, independently are:
  - hydrogen,
  - a linear or branched alkyl group comprising from 1 to 12 carbon atoms,
  - a cycloalkyl group comprising from 3 to 12 carbon atoms,
  - an aryl group comprising in its basic structure 6 to 24 carbon atoms or a heteroaryl group comprising in its basic structure 4 to 24 carbon atoms and at least one heteroatom selected from sulfur, oxygen, and nitrogen, said aryl or heteroaryl group's basic structure optionally being substituted with at least one substituent selected from the group consisting of:
    - + a halogen,

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- 30

or heteroaryl part is as defined above for the aryl or heteroaryl group,

or

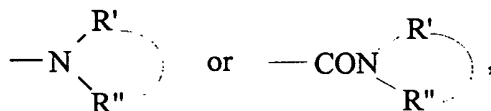
said two substituents  $R_1$  and  $R_2$  together form an adamantyl, norbornyl,

fluorenylidene, di( $C_1$ - $C_6$ )alkylanthracenylidene, or spiro( $C_5$ - $C_6$ )cycloalkyl-

anthracenylidene group, said group being optionally substituted with at least  
one of the substituents listed above for  $R_1$  and  $R_2$  as an aryl or heteroaryl group;

•  $R_3$ , which are identical or different, independently are:

- a halogen,
- a hydroxy,
- a linear or branched alkyl group comprising from 1 to 12 carbon atoms,
- a cycloalkyl group comprising from 3 to 12 carbon atoms,
- a linear or branched alkoxy group comprising from 1 to 12 carbon atoms,
- a haloalkyl, halocycloalkyl, or haloalkoxy group corresponding respectively  
to the above alkyl, cycloalkyl, and alkoxy groups substituted with at least  
one halogen atom,
- an aryl or heteroaryl group as defined above for  $R_1$  and  $R_2$ ,
- an aralkyl or heteroaralkyl group in which the alkyl part is linear or  
branched and comprises from 1 to 4 carbon atoms and in which the aryl or  
heteroaryl part is as defined above for  $R_1$  and  $R_2$ ,
- a phenoxy or naphthoxy group optionally substituted with at least one linear  
or branched alkyl or alkoxy group comprising from 1 to 12 carbon atoms,
- one of the following amine or amide groups:  $-NH_2$ ,  $-NHR$ ,  $-CONH_2$ ,  
 $-CONHR$ ,



$R$ ,  $R'$ , and  $R''$  respectively being as defined above for the amino substituents  
of  $R_1$  and  $R_2$  as aryl or heteroaryl, or

- a group  $-OCOR_7$  or  $-COOR_7$ , wherein  $R_7$  is a linear or branched alkyl group  
comprising from 1 to 6 carbon atoms, a cycloalkyl group comprising from 3  
to 6 carbon atoms, or a phenyl group optionally substituted with at least one  
of the substituents listed above for  $R_1$  and  $R_2$  as aryl or heteroaryl,

or

at least two adjacent groups  $R_3$  together form an aromatic or non-aromatic

cyclic group having one ring or two fused rings which ring(s) are 5- to 7-membered, which ring(s) optionally comprise at least one heteroatom selected from the group consisting of oxygen, sulfur, and nitrogen, and which ring(s) are optionally substituted with at least one substituent selected from those given above in the definition for the aryl or heteroaryl groups which can form R<sub>1</sub> or R<sub>2</sub>; and

- m is an integer from 0 to 4.

2. A compound according to claim 1 having formula (I).

3. A compound according to claim 1 having formula (II).

4. A compound according to claim 1, wherein X is an oxygen.

5. A compound according to claim 1, wherein X is an oxygen and R<sub>4</sub> and R<sub>5</sub> together form an oxo group.

6. A compound according to claim 1, wherein X is an oxygen and each of R<sub>4</sub> and R<sub>5</sub> is a hydrogen.

7. A compound according to claim 1, wherein X is an NR<sub>6</sub> group.

8. A compound according to claim 1, wherein X is an NR<sub>6</sub> group and R<sub>4</sub> and R<sub>5</sub> together form an oxo group.

9. A compound according to claim 1, wherein X is an NR<sub>6</sub> group and each of R<sub>4</sub> and R<sub>5</sub> is a hydrogen.

10. A compound according to claim 1, wherein X is an NR<sub>6</sub> group, R<sub>4</sub> is a hydrogen, and R<sub>5</sub> is a hydroxy.

11. A compound according to claim 1, wherein

- R<sub>1</sub> and R<sub>2</sub> are identical or different and independently represent optionally substituted aryl or heteroaryl groups whose basic structure is selected from those of phenyl, naphthyl, biphenyl,

- pyridyl, furyl, benzofuryl, dibenzofuryl, N-(C<sub>1</sub>-C<sub>6</sub>)alkylcarbazole, thienyl, benzothienyl, dibenzothienyl, and julolidinyl groups; or
- R<sub>1</sub> and R<sub>2</sub> together form an adamantyl or norbornyl group.

5 12. A compound according to claim 11 having formula (I).

13. A compound according to claim 11 having formula (II).

10 14. A compound according to claim 11, wherein X is an oxygen.

15 15. A compound according to claim 11, wherein X is an NR<sub>6</sub> group.

16 16. A compound according to claim 1, wherein at least one of R<sub>1</sub> and R<sub>2</sub> is a para-substituted phenyl group.

17. A (co)polymer and/or crosslinked product obtained by polymerizing and/or crosslinking and/or grafting at least one monomer comprising at least one compound according to claim 1.

20 18. A photochromic compound which is constituted by a compound according to claim 1, or by a mixture of at least two compounds according to claim 1, or by a mixture of at least one compound according to claim 1 and at least one other photochromic compound of a different type and/or at least one non-photochromic coloring agent.

19. A photochromic composition which comprises:

- at least one compound according to claim 1, and/or
- at least one linear or crosslinked (co)polymer which contains, in its structure, at least one compound according to claim 1, and
- (optionally, at least one other photochromic compound of a different type and/or at least one non-photochromic coloring agent and/or at least one stabilizer.)

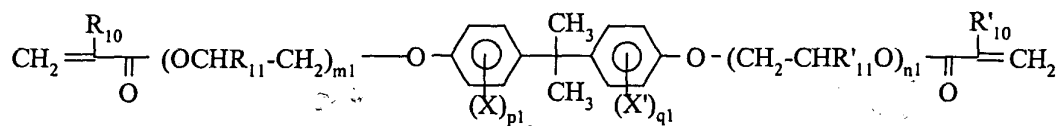
30 20. A (co)polymer matrix which comprises:

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- at least one compound according to claim 1.

21. A (co)polymer matrix according to claim 20, wherein the (co)polymer is selected from the group consisting of:

- an alkyl, cycloalkyl, (poly or oligo)ethylene glycol, aryl or arylalkyl mono-, di-, tri-, or tetra- acrylate or mono-, di-, tri- or tetra- methacrylate which is optionally halogenated or which optionally comprises at least one ether and/or ester and/or carbonate and/or carbamate and/or thiocarbamate and/or urea and/or amide group,
- a polystyrene, polyether, polyester, polycarbonate, polycarbamate, polyepoxide, polyurea, polyurethane, polythiourethane, polysiloxane, polyacrylonitrile, polyamide, aliphatic or aromatic polyester, vinylic polymers, cellulose acetate, cellulose triacetate, cellulose acetate-propionate, or polyvinylbutyral,
- a (co)polymer obtained from a difunctional monomer of the following formula:



in which:

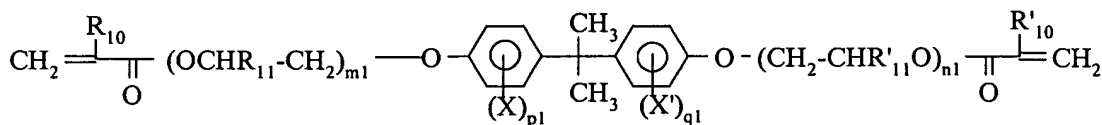
- $\Delta$   $\text{R}_{10}$ ,  $\text{R}'_{10}$ ,  $\text{R}_{11}$  and  $\text{R}'_{11}$  are identical or different and independently are a hydrogen or a methyl group,
- $\Delta$   $m_1$  and  $n_1$  independently are integers between 0 and 4 inclusive,
- $\Delta$  X and X', which are identical or different, are a halogen, and
- $\Delta$   $p_1$  and  $q_1$  independently are integers between 0 and 4 inclusive;
- a copolymer of at least two types of copolymerizable monomers selected from the monomers which are precursors of the polymers listed above; and
- combinations thereof.

22. A (co)polymer matrix which comprises:

- at least one photochromic composition according to claim 19.

23. A (co)polymer matrix according to claim 22, wherein the (co)polymer is selected from the group consisting of:

- an alkyl, cycloalkyl, (poly or oligo)ethylene glycol, aryl or arylalkyl mono-, di-, tri-, or tetra- acrylate or mono-, di-, tri- or tetra- methacrylate which is optionally halogenated or which optionally comprises at least one ether and/or ester and/or carbonate and/or carbamate and/or thiocarbamate and/or urea and/or amide group,
- a polystyrene, polyether, polyester, polycarbonate, polycarbamate, polyepoxide, polyurea, polyurethane, polythiourethane, polysiloxane, polyacrylonitrile, polyamide, aliphatic or aromatic polyester, vinylic polymers, cellulose acetate, cellulose triacetate, cellulose acetate-propionate, or polyvinylbutyral,
- a (co)polymer obtained from a difunctional monomer of the following formula:



in which:

$\Delta$   $\text{R}_{10}$ ,  $\text{R}'_{10}$ ,  $\text{R}_{11}$  and  $\text{R}'_{11}$  are identical or different and independently are a hydrogen or a methyl group,

$\Delta$   $m_1$  and  $n_1$  independently are integers between 0 and 4 inclusive,

$\Delta$  X and X', which are identical or different, are a halogen, and

$\Delta$   $p_1$  and  $q_1$  independently are integers between 0 and 4 inclusive;

- a copolymer of at least two types of copolymerizable monomers selected from the monomers which are precursors of the

- polymers listed above; and
- combinations thereof.

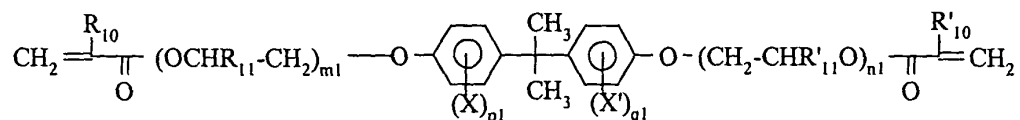
5 24. A (co)polymer matrix which comprises:

- at least one (co)polymer and/or crosslinked product according to claim 17.

10 25. A (co)polymer matrix according to claim 24, wherein the (co)polymer is selected from the group consisting of:

- an alkyl, cycloalkyl, (poly or oligo)ethylene glycol, aryl or arylalkyl mono-, di-, tri-, or tetra- acrylate or mono-, di-, tri- or tetra- methacrylate which is optionally halogenated or which optionally comprises at least one ether and/or ester and/or carbonate and/or carbamate and/or thiocarbamate and/or urea and/or amide group,
- a polystyrene, polyether, polyester, polycarbonate, polycarbamate, polyepoxide, polyurea, polyurethane, polythiourethane, polysiloxane, polyacrylonitrile, polyamide, aliphatic or aromatic polyester, vinylic polymers, cellulose acetate, cellulose triacetate, cellulose acetate-propionate, or polyvinylbutyral,
- a (co)polymer obtained from a difunctional monomer of the following formula:

25



in which:

- 30  $\Delta$   $\text{R}_{10}$ ,  $\text{R}'_{10}$ ,  $\text{R}_{11}$  and  $\text{R}'_{11}$  are identical or different and independently are a hydrogen or a methyl group,
- $\Delta$   $m_1$  and  $n_1$  independently are integers between 0 and 4 inclusive,
- $\Delta$   $\text{X}$  and  $\text{X}'$ , which are identical or different, are a halogen, and



$\Delta$   $p_i$  and  $q_i$  independently are integers between 0 and 4 inclusive;

- a copolymer of at least two types of copolymerizable monomers selected from the monomers which are precursors of the polymers listed above; and
- combinations thereof.

26. An ophthalmic or solar article comprising:

- at least one compound according to claim 1.

27. An article according to claim 26, wherein said article is selected from the group consisting of a lens, a glass pane, or an optical device.

28. An ophthalmic or solar article comprising:

- at least one at least one photochromic composition according to claim 19.

29. An article according to claim 28, wherein said article is selected from the group consisting of a lens, a glass pane, or an optical device.

30. An ophthalmic or solar article comprising:

- at least one (co)polymer and/or crosslinked product according to claim 17.

31. An article according to claim 30, wherein said article is selected from the group consisting of a lens, a glass pane, or an optical device.

32. An ophthalmic or solar article comprising:

- at least one matrix according to claim 20.

33. An article according to claim 32, wherein said article is selected from the group consisting of a lens, a glass pane, or an optical device.

34. An ophthalmic or solar article comprising:

- at least one matrix according to claim 22.

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- at least one matrix according to claim 24.

37. An article according to claim 36, wherein said article is selected from the group consisting of a lens, a glass pane, or an optical device.